



Calibration Weights for Weighing Scales

Weighing scales are increasingly used in harsh working environments; it's very rare these days that they're used in ideal, non-abrasive room temperature conditions. Water and dust ingress particularly, can cause serious damage to the sensitive electronic components within your weighing scale, and over time, your weighing scale's accuracy may be compromised without your prior knowledge. By regularly checking your scale's accuracy with a calibration weight, you can begin to understand the inaccuracy of your weighing scale at specific points of measurement. This will greatly improve the integrity of your measurements, and is critical in a professional environment where traceable accuracy on your weighing measurements is paramount.

The International Organisation of Legal Metrology (OIML), is an inter-governmental organisation which has developed a worldwide standard and technical structure for [calibration weights](#) when they're used in weighing applications which require compulsory verification. Most industrial nations now adhere to this weighing standard, so, when you're testing the accuracy of your weighing scale with a calibration weight, its best practise to follow the OIML standard wherever possible.

Let's look at the OIML calibration weight classifications.

Each classification specifies maximum error discrepancies from a nominal value, but the classification given to a calibration weight also depends upon its material, density, corrosion resistance, hardness, wear resistance, brittleness, magnetic properties, construction, and surface finish.

OIML Calibration Weight Classifications	Calibration Weight Notation, Error Discrepancy, and Material
E1	Weight standards of the highest accuracy class, mostly only used as reference standards for metrological services. The maximum error discrepancy from nominal value at 1 kg is 0.5 mg. Stainless Steel.
E2	The most accurate test or adjusting weights for high resolution, high precision weighing scales. The maximum error discrepancy from nominal value at 1 kg is 1.6 mg. 1mg to 5mg Aluminium, 10mg to 500mg Nickel Silver, 1g to 20kg Stainless Steel.
F1	High precision weights suitable for testing, calibrating and adjusting most high precision weighing scales. The maximum error discrepancy from nominal value at 1 kg is 5 mg. 1mg to 5mg Aluminium, 10mg to 500mg Nickel Silver, 1g to 20kg Nickel Plated Brass.
F2	High precision weights suitable for very accurate precision balances. Ideal weight classification for weighing applications involving high value commercial transactions, e.g. precious stones. The maximum error discrepancy from nominal value at 1 kg is 16mg. 1mg to 5mg Aluminium, 10mg to 500mg Nickel Silver, 1g to 20kg Stainless Steel.
M1	Precision weights for trade weighing scales. The maximum error discrepancy from nominal value at 1 kg is 50mg. 1mg to 5mg Aluminium, 10mg to 500mg Nickel Silver, 1g to 20kg Brass.
M2	Precision weights for testing, calibrating and adjusting trade balances. The maximum error discrepancy from nominal value at 1 kg is 160mg. 1g to 2kg Brass, 5kg to 20kg Cast Iron.
M3	Trade weights for everyday use with weighing scales. The maximum error discrepancy from nominal value at 1 kg is 500mg. 1g to 2kg Brass, 5kg to 20kg Cast Iron.



When a company is certified for quality assurance to ISO 9001-9003, it accepts the obligation, in respect of control of its measuring equipment, to periodically test, or have all of its measuring instruments tested on a regular basis. The testing must be documented and made available to an auditor or customer upon request.

The below table is a UKAS (United Kingdom Accreditation Service) guideline for selecting the most appropriate calibration weight for your weighing scale.

	Weighing Scale Resolution							
Weighing Scale Capacity	100g	10g	1g	100mg	10mg	1mg	0.1mg	<0.1mg
Up to 500g	M3	M3	M3	M2	F2	E2		
Up to 1kg	M3	M3	M3	M1	F1	E1		
Up to 5kg	M3	M3	M2	F2	E2			
Up to 10kg	M3	M3	M1	F1	E1			
Up to 50kg	M3	M2	F2	E2				
Up to 100kg	M3	M1	F1					
Up to 500kg	M2	F2	E2					

Handling & Cleaning Calibration Weights.

With the exception of Cast Iron calibration weights, they shouldn't ever be touched or handled with bare hands, as this will often degrade the weight and alter its weight value. Instead, consider using non-abrasive handling gloves or forceps. To avoid excessive wear, it's always best practise to avoid metal-to-metal contact with your weight. Other than for the very smallest calibration weights, it is advisable that acid-free tissue be placed between the weighing scale's weighing pan and the weight or weights applied to it.

If cleaning your weights is essential, avoid vigorous rubbing or abrasive chemicals. You may use water or some organic solvent, but a period of stabilisation ranging from hours to weeks may be necessary, depending upon the accuracy class and material of the weight.

If you're unsure about any stage of calibrating your weighing scale, always consult the help of a professional body.

[ATP Instrumentation](#) has a wide range of calibration weights available designed to suit your individual weighing requirements. If you have a technical query, please call us now on 01530 566800, and we'll refer you to our instrument technical team.